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ELECTRONICS TECHNICIAN

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Date _JAN-30-5?_

Final Examination--1st Semester

The following problems are multiple choice. Select the correct answer by placing its letter in the space provided.

1. _C_ Increasing the temperature of most metals will:
   a. not affect the resistance.
   b. increase the resistance.
   xc. decrease the resistance.

2. _c_ In a series circuit:
   a. more current flows through the resistor near the B plus.
   b. "   "   "   "   "   "   "   "   negative.
   xc. the same current flows in each resistor.
   d. none of the above.

3. _a_ The resusltant resistance of a parallel circuit:
   xa. is equal to the applied voltage divided by the applied current.
   b. varies with the applied voltage.
   c. varies with the line current.

4. _d_ The total resistance of a parallel circuit:
   a. decreases if the resistance of any branch increases.
   b. remains the same if the resistance of any branch changes.x
   c. increases if the resistance of any branch decreases.
   xd. increases if the resistance of any branch increases.

5. _b_ Electrical work is done when:
   a. watts.
   b. electrons.
   c. volts
        are forced along a wire.

6. _a_ One half of a cycle is called:
   xa. an alternation.
   b. a harmonia.
   c. the frequency.
   d. the phase.

7. _c_ The r.m.s. value of a sine wave of alternating current is the same as the:
   a. peak value.
   b. max. value.
   xc. effective value.
   d. average value.

8. _c_ The effective value of an alternating sine-wave current or voltage is equal to:
   a. .318
   b. 1.414   times the max. value.
   xc. .707
   d. .636

9. _b_ When a body has electrons removed from it, it is said to be:
   a. negatively charged.
   xb. positively   "   .
   c. neutral.

10.a The time constant of a capacitive circuit is given by the formula:
 x a. T = RC
 b. T = C/R
 c. T = R/C

11.a When capacitors are connected in parallel the total capacitance is always:
 x a. greater than
 b. less than   the capacitance of the smallest capacitor.
 c. equal to

12.a When current flows in the sedondary of a transformer it will set up a flux that will act in:
 x a. the opposite direction.
 b. the same direction.
    as the flux set up by the current in the primary.

13.c For the following problems refer to fig. 1
 With a signal applied to the input of V-1, if capacitor C-1 were removed from the circuit:
 a. the gain of the amplifier would increase.
 b. the amplifier woyld oscillate.
 x c. the gain of the amplifier would decrease.
 d. No real difference in output would be apparent.

14.b C-2 shorted:
 a. the tube could be damaged by excessive plate current. ✓
 x b. the screen dropping resistor could be damaged.
 c. the gain of the amplifier would increase at high freq.
 d. the gain of the amplifier would increase at low freq.

15.c With R-3 open the voltage at the plate of V-2 would be:
 a. 180 volts.
 b. 0x 0 volts.
 x c. 300 volts.
 d. none of the above.

16.b A tube operating as a class B amplifier is biased at:
 a. about midpoint of the characteristic curve.
 x b. about cut-off.
 c. about 2 to 3 times cut-off.
 d. about 0 volts.

17.b A single-ended class A power amplifier, as compared to other classes of power amplifiers, such as AB and B, produces:
 a. high distortion and low power. x
 x b. low distrtion and low power.
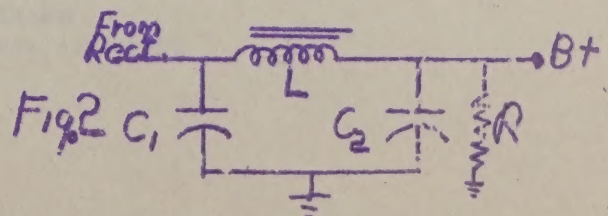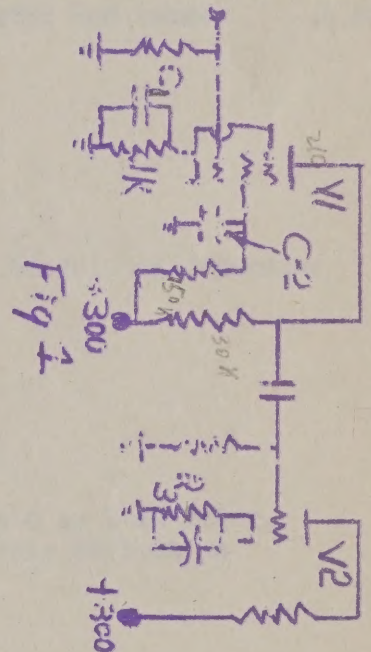 c. high distortion and high power.
 d. low distortion and high power.

18.d For the following refer to fig. 2.
 If the output, or B plus voltage were measured and found to be somewhat higher than normal, which of the following could cause this condition:
 a. C-1 open.
 b. L open.
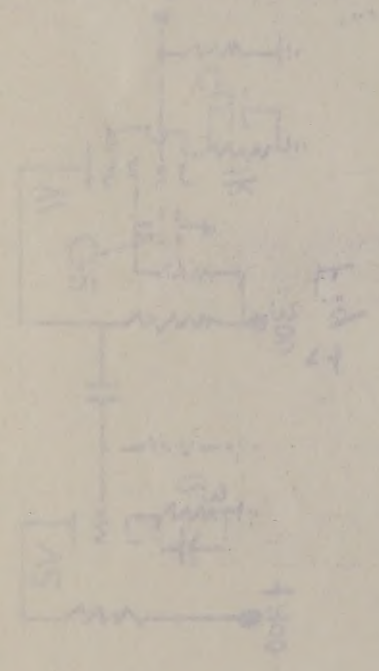 c. C-2 shorted.
 x d. R open

19.d B plus lower than normal:
 a. L shorted.
 b. L open   c. R open   x d. C-2 leaky

Fig 1

Fig 2

From Rect.   B+
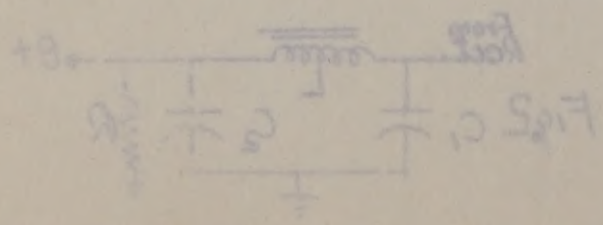
20. _b_ If the voltage applied to a circuit is doubled and the resistance of the circuit
is tripled, the new value of current will be:
    a. The same
 ×b. 2/3 as great
    c. 3/4 as great
    d. Twice as great
    e. 1/2 as great

21. _b_ If resistors of 5, 3, and 15 ohms are connected in parallel, what will their
total resistance be?
    a. 23 ohms
 ×b. 1.66 ohms
 / c. .166 ohms
    d. 16.6 ohms
    3. 8 ohms.

22. _b_ When a 25 ohm 0 to 1 Ma meter is shunted by a 4 ohm resistor and reads   .4 ma
the total current through the (shunt meter) is:
    a. .4 amps
 —b. 2.9 ma ✓
   c. 2.5 ma ✓
    d. 30 ma
    e. .04 ma

2.5
2.9

23. _F_ If two voltmeters are connected in series, how would you be able to determine
the total voltage drop across both instruments?
    a. Multiply the two readings
    b. Subtract one reading from another
    d. Square the two readings
    e. Add the two readings
 ×f. Take the square of the sum of the two readings

24. _a_ What exact value of series resistor should be used with a 0 to 1 ma meter,
having an internal resistance of 27 ohms to get a full scale deflection
of 70 volts?
 ×a. 69,973 ohms
    b. 33,432 ohms
    c. 74,999 ohms
    d. 71.000 ohms.

25. _C_ The suppressor grid in a pentode will:
    a. Prevent secondary emmission from occurring
    b. reduce plate current flow
 × c. Reduce the harmful effects of secondary emmission
    d. Cause an increase in screen current flow

26. _C_ What feature of a remote cut-off pentode distinguishes it from a sharp
cut-off pentode?
    a. The plate structure is closer to the cathode
    b. The screen grid is closer to the cathode
 ×c. The manner in which the grid structure is built
    d. No suppressor is used

27. _b_ The Ep-Ip characteristic curve of a triode has a knee, or bend, at the
start of the curve. This is caused by the effects of:
   a. The heater or filament
  ✓b. The space charge
   c. The interelectrode capacitance
   d. Transit time

The following statements are either True or False--Circle the correct letter
preceding the statement.

T (F) 1. The average DC output voltage of a choke input filter is higher than
       a condenser input.

(T) F 2. Space charge could be overcome by increasing Ep.

T (F) 3. Most receivers use a resistor in place of a filter choke because
       a higher   output voltage is possible.

(T) F 4. The output of a full-wave rectifier is easier to filter than the
       output of a half rectifier.

(T) F 5. A non-synchronous vibrator supply requires a rectifier tube.

(T) F 6. A dynamic characteristic is made with conditions similar to actual
       operating conditions.

(T) F 7. Vacuum tubes conduct current in only one direction.

(T) F 8. An ampere is a rate of flow of electrons.

T (F) 9. A one thousand ohm per voltmeter requires 100 ma for full scale
       deflection.

T (F)10. If the shunt of an ammeter is accidentally disconnected from a
       circuit the pointer will return to zero.

The characteristic curve of a triode has a knee, or bend, at the start of the curve. This is caused by the effects of:

1. The Edison or filament
2. The space charge
3. The interelectrode capacitance
4. Transit time

The following statements are either true or false—Circle the correct letter preceding the statement.

1. The average DC output voltage of a whole input filter is higher than a condenser input.

2. Space charge could be overcome by increasing Ep.

3. Most receivers use a resistor in place of a filter choke because a higher output voltage is possible.

4. The output of a full-wave rectifier is easier to filter than the output of a half rectifier.

5. A non-synchronous vibrator supply requires a rectifier tube.

6. A dynamic characteristic is made with conditions similar to actual operating conditions.

7. Vacuum tubes conduct current in only one direction.

8. An ampere is a rate of flow of electrons.

9. A one thousand ohm per volt meter requires 100 ma for full scale deflection.

10. If the shunt of an ammeter is accidentally disconnected from a circuit the pointer will return to zero.

28. In electricity, the rate of its doing work is called ___POWER___.
    and the unit is ___WATT___.

29. The total current in a parallel circuit is equal to ___THE SUM OF THE CURRENT IN EACH BRANCH___

30. Conductance is the ___RECIPROCAL___ of the resistance.

31. Flux is the ___LINES OF FORCE___ of a magnetic ___FIELD___.

32. Energy is stored in the ___DIELECTRIC___ of a capacitor and in an inductance in the ___MAGNETIC FIELD (CEMF)___

33. A one thousand ohm per voltmeter requires ___ONE (1)___ ma. for full scale deflection.

34. 60-40 solder means 60% ___TIN___ and 40% ___LEAD___.

35. _c_ The suppressor grid in a pentode will:
    a. Prevent secondary emmission from occurring.
    b. Reduce plate current flow.
    © Reduce the harmful effects of secondary emmission.
    d. Cause an increase in screen current flow.

36. _c_ What feature of a remote cut-off pentode distinguishes it from a sharp cut-off pentode?
    a. The plate structure is closer to the cathode.
    b. The screen grid is closer to the cathode.
    © The manner in which the grid structure is built.
    d. No suppressor is used.

37. _b_ The Ep-Ip characteristic curve of a triode has a knee, or bend, at the start of the curve. This is caused by the effects of:
    a. The heater or filament.
    ⓑ. The space charge.
    c. The interelectrode capacitance.
    d. Transit time.

    For V-1 of Fig. 1, values are as follows:
    Plate load resistor   30K
    Screen resistor   150K ✓
    Bias resistor   1K

    Plate voltage (No Sig.)210 Volts
    Bias   3.8 Volts
    Input Signal   .1 volt peak to peak

The following two problems are worth 3 points each.

38. Referring to figure 1, calculate the value of screen voltage on V-1 when no signal is applied to the grid. *180 VOLTS*

39. Referring to figure 1, when the input signal shown is applied to the grid of V-1, the plate current increases by .1 ma on the maximum positive swing of the signal, and decreases by .1 ma on the negative swing of the signal. Calculate the gain of amplifier V-1. *60 GAIN*